FIG. 1

ATGATGGTGGATCCCAATGGCAATGAATCCAGTGCTACATACTTCATCCTAATAGGCCTC
CCTGGTTTAGAAGAGGCTCAGTTCTGGTTGGCCTTCCCATTGTGCTCCCTCTACCTTATT
GCTGTGCTAGGTAACTTGACAATCATCTACATTGTGCGGACTGAGCACAGCCTGCATGAG
CCCATGTATATATTTCTTTGCATGCTTTCAGGCATTGACATCCTCATCTCCACCTCATCC
ATGCCCAAAATGCTGGCCATCTTCTGGTTCAATTCCACTACCATCCAGTTTGATGCTTGT
CTGCTACAGATGTTTGCCATCCACTCCTTATCTGGCATGGAATCCACAGTGCTGCTGGCC
ATGGCTTTTGACCGCTATGTGGCCATCTGTCACCCACTGCGCCATGCCACAGTACTTACG
TTGCCTCGTGTCACCAAAATTGGTGTGGCTGCTGTGGTGCGGGGGGCTGCACTGATGGCA
CCCCTTCCTGTCTTCATCAAGCAGCTGCCCTTCTGCCGCTCCAATATCCTTTCCCATTCC
TACTGCCTACACCAAGATGTCATGAAGCTGGCCTGTGATGATATCCGGGTCAATGTCGTC
TATGGCCTTATCGTCATCATCTCCGCCATTGGCCTGGACTCACTTCTCATCTCCTTCTCA
TATCTGCTTATTCTTAAGACTGTGTTGGGCTTGACACGTGAAGCCCAGGCCAAGGCATTT
GGCACTTGCGTCTCTCATGTGTGTGCTGTGTTCATATTCTATGTACCTTTCATTGGATTG
TCCATGGTGCATCGCTTTAGCAAGCGGCGTGACTCTCCGCTGCCCGTCATCTTGGCCAAT
ATCTATCTGCTGGTTCCTCCTGTGCTCAACCCAATTGTCTATGGAGTGAAGACAAAGGAG
ATTCGACAGCGCATCCTTCGACTTTTCCATGTGGCCACACACGCTTCAGAGCCCTAG

FIG. 2

MMVDPNGNESSATYFILIGLPGLEEAQFWLAFPLCSLYLIAVLGNLTIIYIVRTEHSLHE
PMYIFLCMLSGIDILISTSSMPKMLAIFWFNSTTIQFDACLLQMFAIHSLSGMESTVLLA
MAFDRYVAICHPLRHATVLTLPRVTKIGVAAVVRGAALMAPLPVFIKQLPFCRSNILSHS
YCLHQDVMKLACDDIRVNVVYGLIVIISAIGLDSLLISFSYLLILKTVLGLTREAQAKAF
GTCVSHVCAVFIFYVPFIGLSMVHRFSKRRDSPLPVILANIYLLVPPVLNPIVYGVKTKE
IRQRILRLFHVATHASEP

FIG. 3

CCACGCGTCCGCTCTGCCCTGAATCCAGGATAGACCAGGACAACAAGATGAGTGGCTAAC
TGTAGGATGGTGTCCATCTGTGCTCTAGGGGAGGAGTAGCATCAAAGGAGAAGCAAGAAC
TGAGAACTGTTTGGGGCACTGAAGAAGTAGGACTAAGGAAGAGTTAGGGGGTTAGTACAA
ATCTGAGGCCTGGTTTTCTGGAAAGAGACCAGAGACTGACCTTATTGCATGTCATACAAC
ATGCTTGCTTAGAGACCCCTAATTTATTTTCTTCTCTTACTCTTTCTGAGGAAGCATGAG
CCACACCCTCAGTTAGTTTTGTATAATCTTAGGCTTGATGAGAATATAATCTTAGTCTTG
AAGGCTTTAAAGGGGAAGAAATAGCTGTCTGTGTTAGTGGTGTGTCAGTCAGCAGGAGAA
CCTGCTAGGGGTGGAAGGAGGAGGGTAGGAGTATAGCCTAGACCATGAGTAGATACCCCG
CTCCACCTTGAAAGTCTCCTACTGGACCTCTTATGATGGAGTTAATACCTCCTGTTTCCT
CTATTCCAGATTGTTTTCAGTTTCCAGAAGGCAAAACTGACATCTCCCAGGAGTCCAAGT
AGGAGATTAGGGCCTCCCGTCCCTATCTACTCAGTGCTAGCCTTGGCTAAGAGAGAGGAA
ATTCCTGCCTAGAGGGGAAAATCTGCAGGACTTCGTTACCACTTTCACTTTGGCAGAGGA
AGGAGGTCAGGGATGGAAGGGGAAGTGAGTCTAGAAATTAAAACATAGAATTCTGTCTAC
AGGTGGTGGAGAGCCTTTCTGAAAGTGCTTCTGGGTTGAGGCTGTCACCTAGATTTTATA
TTAGAGTTTAAGTGTTCCAAAAAATTAAGAAGCAGGAAGTAGAAAAGAGAACAATTTCAG
AAGCAGACGAAAGGAACAGTAATAGGAAGATCTAGCAAGGATGTGGTGGGGCAGTTTCAG
TGTGAGATGCCATGGACAGGAAAATGGCAGCATATGTGTGTGTGTGTGTGTGTGTGTGTG
TCCATGAGACAGAGAGACATAAATAACTAAATAAAAAGGCATATCACAAAGAGGGGCTCC
TGCTTCAGCTTGAGTCCTGGATGCAAAGACATGTGGACTGGGATCCTAGCAACCTATCTG
CAGCCAAGGACATGACGTTAGACGCCCCAAGAAAAGGAAAATTGGTCAAACATAGGAAGA
GCACTCAAGTGCCAGCTACAGTGAATGACAAATACCCACCACAAGCACAAGCTCTACATT
CACAAAAACTTGGAAAACACAAGTTCATAGACTGGGCAACCCTGAGTAGTGGAGAGATCA
CCAGCCATGTTTCAGGTTGTACCCTCTACCTGCCTGGTGCTGGTCACAGTTCAGCTTCTT
C

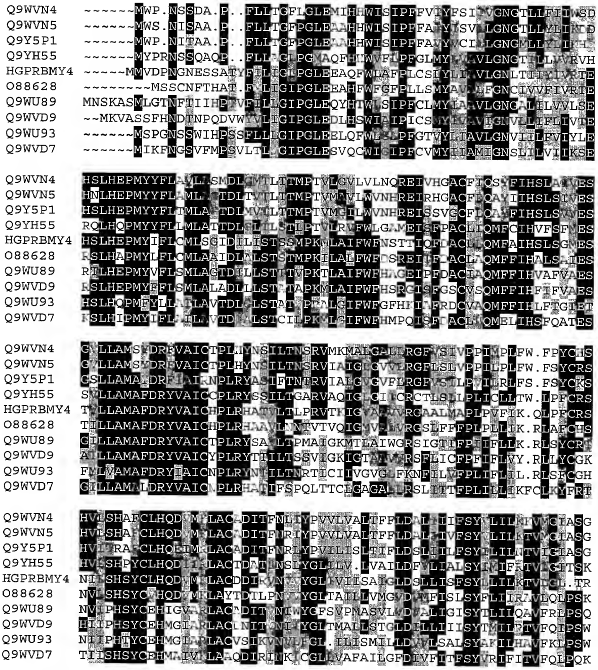
FIG. 4

```
GTGTCAGTGATCAAACTTCTTTTCCATTCAGAGTCCTCTGATTCAGATTTTAATGTTAAC
ATTTTGGAAGACAGTATTCAGAAAAAAAATTTCCTTAATAAAAATACAACTCAGATCCTT
CAAATATGAAACTGGTTGGGGAATCTCCATTTTTTCAATATTATTTTCTTCTTTGTTTTC
TTGCTACATATAATTATTAATACCCTGACTAGGTTGTGGTTGGAGGGTTATTACTTTTCA
TTTTACCATGCAGTCCAAATCTAAACTGCTTCTACTGATGGTTTACAGCATTCTGAGATA
AGAATGGTACATCTAGAGAACATTTGCCAAAGGCCTAAGCACGGCAAAGGAAAATAAACA
CAGAATATAATAAAATGAGATAATCTAGCTTAAAACTATAACTTCCTCTTCAGAACTCCC
AACCACATTGGATCTCAGAAAAATACTGTCTTCAAAATGACTTCTACAGAGAAGAAATAA
TTTTTCCTCTGGACACTAGCACTTAAGGGGAAGATTGGAAGTAAAGCCTTGAAAAGAGTA
CATTTACCTACGTTAATGAAAGTTGACACACTGTTCTGAGAGTTTTCACAGCATATGGAC
CCTGTTTTTCCTATTTAATTTTCTTATCAACCCTTTAATTAGGCAAAGATATTATTAGTA
CCCTCATTGTAGCCATGGGAAAATTGATGTTCAGTGGGGATCAGTGAATTAAATGGGGTC
ATACAAGTATAAAAATTAAAAAAAAAAGACTTCATGCCCAATCTCATATGATGTGGAAGA
ACTGTTAGAGAGACCAACAGGGTAGTGGGTTAGAGATTTCCAGAGTCTTACATTTTCTAG
AGGAGGTATTTAATTTCTTCTCACTCTCTCCAGTGTTGTATTTAGGAATTTCCTGGCAAC
AGAACTCATGGCTTTAATCCCACTAGCTATTGCTTATTGTCCTGGTCCAATTGCCAATTA
CCTGTGTCTTGGAAGAAGTGATTTCTAGGTTCACCATTATGGAAGATTCTTATTCAGAAA
GTCTGCATAGGGCTTATAGCAAGTTATTTATTTTTAAAAGTTCCATAGGTGATTCTGATA
GGCAGTGAGGTTAGGGAGCCACCAGTTATGATGGGAAGTATGGAATGGCAGGTCTTGAAG
ATAACATTGGCCTTTTGAGTGTGACTCGTAGCTGGAAAGTGAGGGAATCTTCAGGACCAT
GCTTTATTTGGGGCTTTGTGCAGTATGGAACAGGGACTTTGAGACCAGGAAAGCAATCTG
ACTTAGGCATGGGAATCAGGCATTTTTGCTTCTGAGGGGCTATTACCAAGGGTTAATAGG
TTTCATCTTCAACAGGATATGACAACAGTGTTAACCAAGAAACTCAAATTACAAATACTA
AAACATGTGATCATATATGTGGTAAGTTTCATTTTCTTTTTCAATCCTCAGGTTCCCTGA
TATGGATTCCTATAACATGCTTTCATCCCCTTTTGTAATGGATATCATATTTGGAAATGC
CTATTTAATACTTGTATTTGCTGCTGGACTGTAAGCCCATGAGGGCACTGTTTATTATTG
AATGTCATCTCTGTTCATCATTGACTGCTCTTTGCTCATCATTGAATCCCCCAGCAAAGT
GCCTAGAACATAATAGTGCTTATGCTTGACACCGGTTATTTTTCATCAAACCTGATTCCT
TCTGTCCTGAACACATAGCCAGGCAATTTTCCAGCCTTCTTTGAGTTGGGTATTATTAAA
TTCTGGCCATTACTTCCAATGTGAGTGGAAGTGACATGTGCAATTTCTATACCTGGCTCA
TAAAACCCTCCCATGTGCAGCCTTTCATGTTGACATTAAATGTGACTTGGGAAGCTATGT
GTTACACAGAGTAAATCACCAGAAGCCTGGATTTCTGAAAAAACTGTGCAGAGCCAAACC
TCTGTCATTTGCAACTCCCACTTGTATTTGTACGAGGCAGTTGGATAAGTGAAAAATAAA
GTACTATTGTGTCAAGTCAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
```

FIG. 5

MMVDPNGNES SATYFILIGL PGLEEAQ**FWL AFPLCSLYLI AVLGNLTIIY**
**IV**RTEHSLHE PMY**IFLCMLS GIDILISTSS MPKMLAIFW**F NSTTIQFDAC
LLQM**FAIHSL SGMESTVLLA MAFDRYVAIC** HPLRHATVLT LPRVTK**IGVA**
**AVVRGAALMA PLPVFI**KQLP FCRSNILSHS YCLHQDVMKL ACDDIR**VNVV**
**YGLIVIISAI GLDSLLISFS YLLIL**KTVLG LTREAQAKA**F GTCVSHVCAV**
**FIFYVPFIGL SMV**HRFSKRR DSP**LPVILAN IYLLVPPVLN PIVYGV**KTKE
IRQRILRLFH VATHASEP

FIG. 6A



```
Q9WVN4     ~~~~~~~MWP.NSSDA.P..FLLTGFLGLEMIHHWISIPFFVIYFSIIVGNGTLLFIIWSD
Q9WVN5     ~~~~~~~MWS.NISAA.P..FLLTGFPGLEAAHHWISIPFFAVYISVLLGNGTLLYLIKDD
Q9Y5P1     ~~~~~~~MWP.NITAA.P..FLLTGFPGLEAAHHWISIPFFAVYVCILLGNGMLLYLIKHD
Q9YH55     ~~~~~~~MYPRNSSQAQP..FLLAGLPGMAQFHIWVFLPFGLMYLVAVLGNGTILLVVRVH
HGPRBMY4   ~~~~~~MMVDPNGNESSATYFILIGLPGLEEAQFWLAFPLCSLYLIAVLGNLTIIYIVRTE
O88628     ~~~~~~~~~MSSCNFTHAT.FVLIGIPGLEEAHFWFGFPLLSMYAVALFGNCIVVFIVRTE
Q9WU89     MNSKASMLGTNFTIIHPTVFILLGIPGLEQYHTWLSIPFCLMYIAAVLGNGALILVVLSE
Q9WVD9     ~~MKVASSFHNDTNPQDVWYVLIGIPGLEDLHSWIAIPICSMYIVAVIGNVLLIFLIVTE
Q9WU93     ~~~~~~~MSPGNSSWIHPSSFLLLGIPGLEELQFWLGLPFGTVYLIAVLGNVIILFVIYLE
Q9WVD7     ~~~~~~~MIKFNGSVFMPSVLTLMGIPGLESVQCWIGIPFCVMYIIAMIGNSLILVIIKSE

Q9WVN4     HSLHEPMYYFLAVLAASMDLGMTLTTMPTVLGVLVLNQREIVHGACFIQSYFIHSLAIVES
Q9WVN5     HNLHEPMYYFLAMLAATDLTVTLTTMPTVMAVLWVNHREIRHGACFLQAYIIHSLSIVES
Q9Y5P1     HSLHEPMYYFLTMLAATDLMVTLTTMPTVMGILWVNHREISSVGCFLQAYFIHSLSVVES
Q9YH55     RQLHQPMYYFLLMLATTDLGLTLSTLPTVLRVFWLGAMEISFPACLTQMFCIHVFSFMES
HGPRBMY4   HSLHEPMYIFLCMLSGIDILISTSSMPKMLAIFWFNSTTIQFDACLLQMFAIHSLSGMES
O88628     RSLHAPMYLFLCMLAAIDLALSTSTMPKILALFWFDSREITFDACLAQMFFIHALSAIES
Q9WU89     RTLHEPMYVFLSMLAGTDILLSTTTVPKTLAIFWFHAGEIPFDACIAQMFFIHVAFVAES
Q9WVD9     RSLHEPMYFFLSMLALADLLLSTATAPKMLAIFWFHSRGISFGSCVSQMFFIHFIFVAES
Q9WU93     HSLHQPMFYLLAILAVTDLGLSTATVPRALGIFWFGFHKIAFRDCVAQMFFIHLFTGIET
Q9WVD7     KSLHIPMYIFLAILAVTDIALSTCILPKMLGIFWFHMPQISFDACLLQMELIHSFQATES

Q9WVN4     GVLLAMSYDRFVAICTPLHYNSILTNSRVMKMALGALLRGFVSIVPPIMPLFW.FPYCHS
Q9WVN5     GVLLAMSYDRFVAICTPLHYNSILTNSRVIAIGLGVVLRGFLSLVPPILPLFW.FSYCRS
Q9Y5P1     GSLLAMALDRFIAIRNPLRYASIFTNTRVIALGVGVFLRGFVSTLPVILRLFS.FSYCKS
Q9YH55     SVLLAMAFDRYVAICCPLRYSSILTGARVAQIGLGIICRCTLSLLPLICLLTW.LPFCRS
HGPRBMY4   TVLLAMAFDRYVAICHPLRHATVLTLPRVTKIGVAAVVRGAALMAPLPVFIK.QLPFCRS
O88628     TILLAMAFDRYVAICHPLRHAAVLNNTVTVQIGMVALVRGSLFFFPLPLLIK.RLAFCHS
Q9WU89     GILLAMAFDRYVAICTPLRYSAVLTPMAIGKMTLAIWGRSIGTIFPIIFLLK.RLSYCRS
Q9WVD9     AILLAMAFDRYVAICYPLRYTTILTSSVIGKIGTAAVVRSFLICFPFIFLVY.RLLYCGK
Q9WU93     FMLVAMAFDRYIAICNPLRYNTILTNRTICIIVGVGLFKNFILVFPLIFLIL.RLSFCGH
Q9WVD7     GILLAMALDRYVAICNPLRHATIFSPQLTTCLGAGALLRSLITTFPLILLIKFCLKYFRT

Q9WVN4     HVLSHAFCLHQDVMKLACADITFNLIYPVVLVALTFFLDALIIIFSYVLILKTVMGIASG
Q9WVN5     HVLSHAFCLHQDVMKLACADITFNRIYPVVLVALTFFLDALIIVFSYVLILKTVMGIASG
Q9Y5P1     HVITRAFCLHQEIMKLACADITFNRLYPVILISLTIFLDSLIILFSYILILNTVIGIASG
Q9YH55     HVLSHPYCLHQDIIRLACTDATLNSLYGLILV.LVAILDFVLIALSYIMIFKTVLGITSK
HGPRBMY4   NIISHSYCLHQDVMKLACDDIRVNVVYGLIVIISAIGLDSLLISFSYLLILKTVLGL.TR
O88628     NVLSHSYCVHQDVMKLAYTDTLPNVVYGLTAILLVMGVDVMFISLSYFLIIRAVLQLPSK
Q9WU89     NVIPHSYCEHIGVARLACADITVNIWYGFSVPMASVLVDVALIGISYTLILQAVFRLPSQ
Q9WVD9     HIIPHSYCEHMGIARLACLNITVNIIYGLTMALLSTGLDILLIIISYTMILRTVFQIPSW
Q9WU93     NIIPHTYCEHMGIARLACVSIKVNVLFGL.ILISMILLDVVLSALSYAKILHAVFKLPSW
Q9WVD7     TIISHSYCEHMAIVKLAAQDIRINKICGLLVAFAILGFDIVFITFSYVRIFITVFQLPQK
```

FIG. 6B

```
Q9WVN4    EERKKSLNTCVSHISCVLVFYITVIGLTFIHRF.GKNAPHVVHITMSYVYFLFPPFMNPI
Q9WVN5    EERAKALNTCVSHISCVLVFYITVIGLIFIHRF.GKNAPHVVHITMSYVYFLFPPFMNPI
Q9Y5P1    EERAKALNTCISHISCVLIFYVTVMGLVFIYRF.GKNVPEVVHITMSYIYFLFPPLMNPV
Q9YH55    EEQTKALNTCVSHFCAVLIFYIPLAGLSIIHRY.GRNAPPISHAVMANVYLFVPPFLNPV
HGPRBMY4  EAQAKAFGTCVSHVCAVFIFYVPFIGLSMVHRF.SKRRDSPLPVILANIYVLVPPVLNPI
O88628    SERAKAFGTCVSHIGVVLAFYVPLIGLSVVHRF.GNSLDPIVHVLMGDVYLLLPPVINPI
Q9WU89    DARHKALNTCGSHIGVILLFFIPSFFTFLTHRF.GKNIPHHVHILMANLYVLVPPMLNPI
Q9WVD9    AARYKALNTCGSHICVILLFYTPAFFSFFAHRFGGKTVPRHIHILVANLYVVVPPMLNPI
Q9WU93    EARLKALNTCGSHVCVILAFFTPAFFSFLTHRF.GHNIPRYIHILLANVYVIIPXALNPI
Q9WVD7    EARFKAFNTCIAHICVFLQFYLLAFFSFFTHRF.GAHIPPYVHILLSDLYLLVPPFLNPI

Q9WVN4    IYSIKTKQIQRSILRLLSKHSRT~~~~~~~~
Q9WVN5    IYSIKTKQIQRSVLHLLSV~~~~~~~~~~~~
Q9Y5P1    IYSIKTKQIQYGIVRLLSKHRFSR~~~~~~~
Q9YH55    LYSMKSKAICKGILRLLCQRAAWPGHAQNC~
HGPRBMY4  VYGVKTKEIRQRILRLFHVATHAS.EP~~~~
O88628    IYGAKTKQIRTRVLAMFKISCDKDIEAGGNT
Q9WU89    IYGAKTKQIRDS.MTRMLSVVWKS~~~~~~~
Q9WVD9    IYGVKTKQIQDR.VVFLFSSVSTCQHDSRC~
Q9WU93    IYGVRTKQIQDRAVTILCNEVGQLADD~~~~
Q9WVD7    VYGIKTKQIRDQVLKMFFSKKPL~~~~~~~~
```

FIG. 7

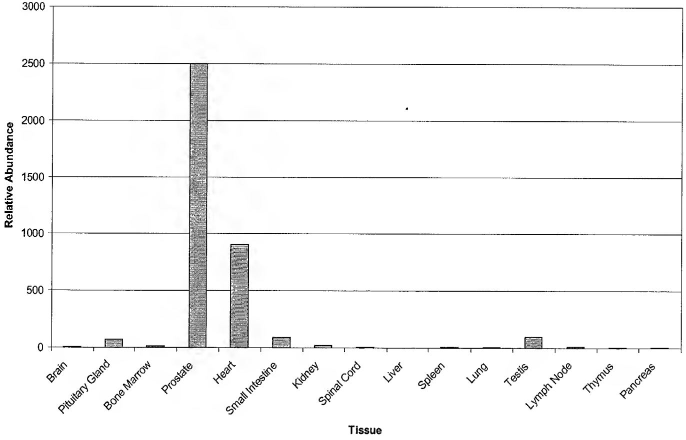

3000
2500
2000
1500
1000
500
0
Relative Abundance
Brain
Pituitary Gland
Bone Marrow
Prostate
Heart
Small Intestine
Kidney
Spinal Cord
Liver
Spleen
Lung
Testis
Lymph Node
Thymus
Pancreas
Tissue

FIG. 8

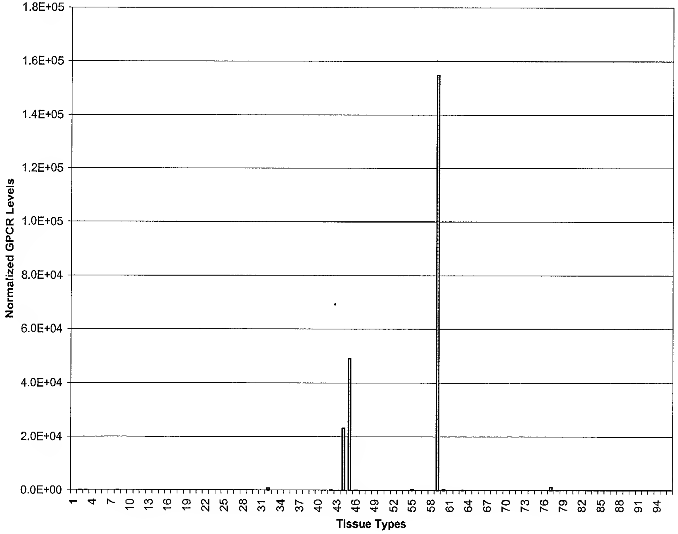

1.8E+05
1.6E+05
1.4E+05
1.2E+05
1.0E+05
8.0E+04
6.0E+04
4.0E+04
2.0E+04
0.0E+00
Normalized GPCR Levels
1
4
7
10
13
16
19
22
25
28
31
34
37
40
43
46
49
52
55
58
61
64
67
70
73
76
79
82
85
88
91
94
Tissue Types

FIG. 9

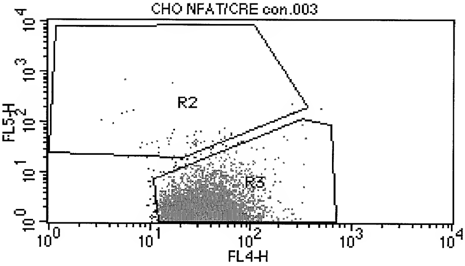

CHO NFAT/CRE con.003
R2
R3
FL5-H
FL4-H
$10^0$
$10^1$
$10^2$
$10^3$
$10^4$

FIG. 10

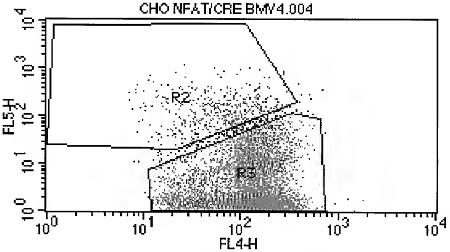

CHO NFAT/CRE BMV4.004
R2
R3
FL5-H
FL4-H
$10^0$
$10^1$
$10^2$
$10^3$
$10^4$

FIG. 11

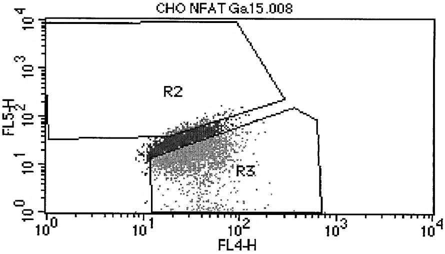

CHO NFAT Ga15.008
FL5-H
FL4-H
R2
R3
$10^0$
$10^1$
$10^2$
$10^3$
$10^4$

FIG. 12

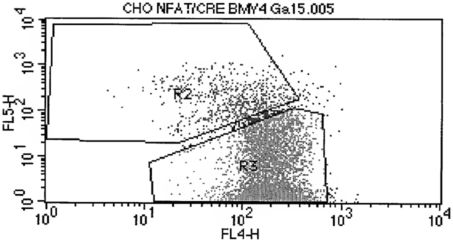
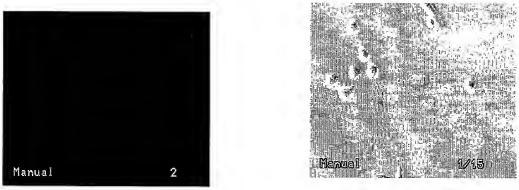

CHO NFAT/CRE BMY4 Ga15.005
FL5-H
FL4-H
R2
R3
$10^0$
$10^1$
$10^2$
$10^3$
$10^4$

FIG. 13.

a. CHO-NFAT G alpha 15 (Fluorescent vs. Bright Field)



b. CHO-NFAT Galpha 15 HGPRBMY4 (Fluorescent vs. Bright Field)

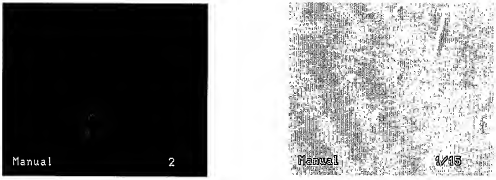
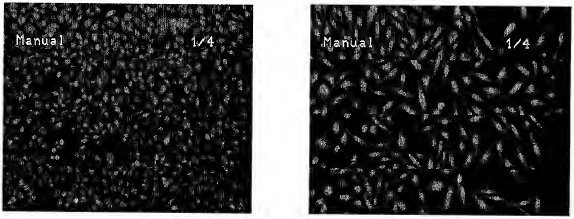


FIG. 14

a. CHO-NFAT/ CRE

b. CHO-NFAT/CRE + F/T/P



c. CHO-NFAT/CRE oGPCR-Intermediate

d. CHO-NFAT/CRE oGPCR High